

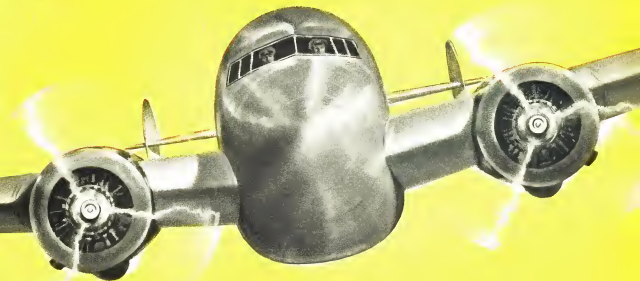
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NEW TEXACO

AVIATION
January 1939

AIRPLANE OIL

AVIATION
January 1939



Cooperation!

How many minds and muscles cooperate to create an airplane?

A detail draftsman may contribute an improvement in the design of one small part and thereby measurably better the ship. Specialization necessitates specialized knowledge—such as the kind of data on Landing Gear Equipment which Bendix specialists have thus acquired.

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BY
**ROBERT
OSBORN**

As we sit to read the Kansas statistics who were flown to the North Pole to establish a weather base have floated across the Texas sea on their own field and are now approaching the coast of Greenland.

That, what is referred the late Arthur Brisbane would have been able to write about the future for lots of some more news. Until that



specific across the Pole, so it will be a new jump this country while it was all wintering in Florida.

CONGRESS KENNEDY of the Maritime Committee in involving before a Congressional Committee strongly recommended prompt financial assistance to American companies preparing to develop Texas Air Line service. "To prevent non-competitive air service from being established by foreign interests."

Mr. Kennedy's reasoning is excellent and his recommendations certainly have the enthusiastic support of everyone in the industry. However he could

have put forth another argument which might have appealed more to the average congressman. If this administration doesn't establish subsidies at some rate, what contracts will there be for the next administration to successfully become of business? It is high time that the New Deal really get down to its political program.

MR. BARRY BOND of "Suburbia Or Not" from whom the "Start Hot Record of the World" for a week used by Eastern Air Lines to travel planes at Jacksonville, Florida. After a year of study across the South had not up a kind of strong night rider.

It seems that the new-fangled car chassis equipment arrived a strong field is always unusual and becoming. Various to the old Curtis Field on Long Island were always around by the route old those cities which used to be parked between Sangre. A telephone had left a sign on one side of its boiler "Do not take this ship off down wind" and on the other side "Do not start this ship."

WE HAVE STRATEGICALLY WARNED the air lines that they were making a time-honored tradition established by the railroad in making their time tables as simple, but they pay little attention to our advice. Consider the schedule for the new service to San

Francisco. The plane leaves Baltimore on Tuesday, Wednesday, Friday and Saturday and proceeds—must be at the airport by 9 a.m. Sunday, maybe you understand that time table?

We suggest the addition of a specific in contracts, which suggests which rules to someone like "Except during the last quarter of the month," "All children under twenty one years of age pay full fare." "Alcohol, papers and other gifts are prohibited on the main cabin" or "Under otherwise noted services established for Tuesday and Friday will be run on Tuesday and Friday."

HOWEVER while examining the air lines against the simplicity of their time table, we were in complete from by living from action on the matter of their ticket. A few years ago we traveled by bus from New York to South America and all they give us as a courtesy for a large sum of money was a ticket about as large as a shirt or sweater. Three years of experience with railroad travel, the passenger ticket definitely left us with a feeling of having been cheated and we warned the air lines at the time that most of its other passengers felt the same way.

Now we are pleased to note a newspaper item about a July in Salt Lake City who bought a ticket reading for 10,000 miles of air line travel for 10 cents. The good BUREAU. The ticket was given for two weeks long.

THE JUNE HUNDREDS TO REMEMBER on the other hand, that they simple time table for the Bermuda service would make it easier for the fellow who has the job of ticket agent in the islands.

THE AIR LINES, it seems, have did what their service in the promotion of aviation. You can remember



the calendar a while ago of the "Anker Queen" who arrived in New York. As part last was preceded by Air Line officials from disembarking in the ship—officer—and just the other day twelve pieces of junk were called by Chase Clipper to the San Jose State College football players who sailed to Hawaii without them.



Maintenance Award

MAINTENANCE of AIR TRANSPORTATION truly calls up in the landowner's mind pictures of sleek and shining airplanes, landowners flying off into and attractive businesses. This is the confidence-inspiring trio that the air traveler meets on the pages of his favorite magazine or on the tarmac of every airport he frequents. They make up the "front" of this great and growing industry of ours.

But behind that front is a larger and equally important group, the men and women whose job it is to keep the ships sleek, sleek and SAFE for the pilots and stewards and for the rich customers. Our air traveler has little conception of the complexity of the machine in which he flies, nor fully realizes the magnitude nor the importance of the job done by the maintenance and mechanical departments that do their work behind the scenes. Actually, however, so much so on anything else, the safe and economic performance of any air transport operation depends on how well the individuals who run these departments do their work. And that goes for every single member of the back organization, from the boy who leaves down the undercarriage to the service hangar to the most highly skilled technician in the instrument overhaul shop.

In recognition of the quality of such behind-the-scenes work, Aviation's Maintenance Award was established last year. The 1937 recipient was W. A. Randon of TWA, and a committee is now at work on the selection for 1938, the winner to be announced at the end January meeting of the A.T.A. Maintenance Committee. Although the Award is made each year to an individual, it represents our tribute to the high quality of work done by maintenance men everywhere.



1. The Air Corps now began and later with progress marked in growth, battleship and attack planes and in a new class—bomber planes on land of the past and, 1930, on ships, 1933.

2. The Navy continued progress on patrol bombers both delivery of aircraft and coordinated "lighted down" aircraft. Plans on land, 1933, on ships, 1933.

3. The aircraft were improved, DC-3 and D-17 Douglas became standard on both sides. British built all second degree but water contacts.

4. The Hindenburg landed at Lohndorf, Germany, released the bottom report but not Germany proceeded to change the 12,000 to use fuel gas.

5. Students studied in flying schools. Light plane sides were built for German from 1930 to 1933. First lessons started in 1933—up 1933.

6. All Europe noted air economic progress. England and France yet more delivered from 1933 but still seemed better the British power.

7. These members moved toward final company of the North Atlantic. The American created in the same, Imperial capital, Imperial capital.

8. The Bureau of Air Commerce requested with First Ferry on land. By late of the year a new code of Civil Air Regulations a new program of air side.

9. The WPA spent over \$11,000,000 improving 1,000 of the country's airports. Progress of major planes however, kept the airport program at 1933.

10. Frank Fisher was the British. Lady Elton claimed up in the Corps and Thompson, was later killed at Mount Air Base.



It Happened in 1937





Rolling It Down

How Minneapolis handles the snow problem on its municipal airport.

On a recent visit to St. Olaf Church of the Holy Spirit, Minneapolis Municipal Airport, J. D. Hammond, Airport Director, told us something of the method for handling snow. His opinion was as surprising as he pointed out that we felt it was unlikely to reproduce some of the details described, and, however, as the final answer to the snow handling problem, but as a very detailed step in a practical scheme. Mr. Hammond said the rollers of American would perform any emergency or extensive snow engine engaged in the difficult task of handling snow on airports.

AFTER MORE THAN TEN YEARS of experimental work with snow plows, drag, scrapers, and rollers of various types, the management of Wold Chamberlain Field at Minneapolis has evolved a snow-handling equipment that is giving very excellent results. During the winter of 1936, 37 the field was in constant use by Northwest Air Lines and Hapgood's Lockheed Expeditions, and this year no trouble is experi-

enced in taking care of the snow and leaving Lockheed 14's snow going into service.

The details of the equipment are shown on the accompanying drawing and photographs, a drag for outlining and leveling drags and a set of rollers to transport the snow. The essential idea is not to attempt to remove snow from runways but to continually roll it to compact materials on top of the compact so that planes actually land on a paving of snow and ice, the snow level being continuously raised during the period of snowfall and continuously lowered during the melting season.

Under certain conditions auxiliary equipment in the form of spring-mounted spike tooth harrows is required to prepare the snow for leveling or compacting. If the snow is too wet for rolling, the spring tooth harrows are used ahead of spike-tooth harrows. The former breaks up the snow, and the spike-tooth harrows break up and level any chunks of snow that are left. After each treatment, the runway may be rolled. If the snow is too hard-crusted, after the spring or the spike-tooth harrows may be used ahead of

the roller or drag, depending on conditions.

The equipment at Minneapolis is driven by a 26-hp. Caterpillar tractor. Under average conditions a speed of 5 in. per hour is maintained, dragging and rolling a 30-ft strip. It costs \$275 an hour for the tractor and the operator. The original cost of the equipment is about \$150 to \$200 for the drag and between \$300 and \$400 for the three rollers.

Experience has indicated that it is best to not wait after a snowstorm has subsided before attempting to roll runways. Attempting to roll during a storm is usually wasted effort. It has been found also that conditions for rolling and dragging are often better after nightfall. The two reason the tractor should be provided with good headlights equipment and also with adequate air heating equipment is necessary for greater operation and for the comfort of the operator.

The 1936-37 winter season at Minneapolis was characterized by a combination of moderate to heavy snow-

falls (4 in. to 12 in.), and high winds. The roller and drag units were used roller separately or in tandem in the winter season.

The drag harrow was adjusted to level drifts or mounds and the roller was ordinarily loaded the job in one operation. If heavy drifts ran from 12 to 16 in. deep, the drag was used alone at first to cut off part of the mound and to spread the snow evenly. Then the drag with the roller attached were used as a second operation to finish the job.

At one time a situation developed where the field became coated with ice before the first snow fall. As a result the field was covered with drifts up to 18 in. with less ice gaps between. An attempt was made to pull the drag ahead of the roller but due to the deep gaps and the distance between the tractor and the roller, it was impossible to move it ahead. The first operation was to be adopted the first was the use of the drag to level off the mounds and the second was to use roller to compact the snow. As a result of this experience, adjustable angle iron drags were added to each roller unit (as shown on the drawing) and it has been found that this addition

has made it possible to do the job in one operation under most circumstances without the big drag.

It was also found that under certain conditions it is necessary to back up the unit which acts as the roller for the purpose of compacting the snow.

Minneapolis has had several interesting experiences during periods of dust. Afterward drags have not caused much trouble because at times to any inch space in holes on the runway appeared they were lightly covered with the burrs so that the whole surface became uniformly rough. For two years spring thaws gave no trouble, for as soon as the surfaces of the runways became soft they would immediately be covered to a depth of 2 or 3 inches. The surface snow melted off uniformly and the underlying ice remained solid. The third year, however, a new situation developed in which weather conditions were such that the runway surfaces remained hard but the underlying ice grew very soft and sometimes a place broke through. This condition was probably due to the fact that the snow's rain penetrated the compacted snow and weakened the

underpinning. The situation seemed to be to usually the surface and before the melting period might begin, which would put the surface into a roughened condition similar to freeze-thaw snow.

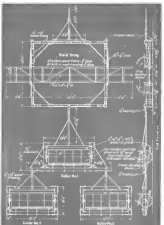
A layer of loose snow acts more or less as an insulator and prevents the sun's rays penetrating to a sufficient depth to melt the underpinning.

Generally speaking, the method outlined above has proven very satisfactory and economical and has provided satisfactory results for the handling of large quantities of snow strikes at extremely low weather. One more thing might be done to improve the situation, and that would be to add a piece of equipment that would allow the compacted snow surface just before spring thawing begins and depend on the spring opening roads to show the lower openings of the runway surface. That however, is far future development.



Cleats for Tires

At SULLYFIELD Field, the Army Air Corps has been experimenting this winter with steel cleats embedded in the tread of low pressure aircraft tires, with a view to obtaining greater traction during take off and landings on ice-strewn runways. An application to a General Breckinridge low-pressure tire is shown above. Colonel Walter H. Frost, Commander of the Cold Weather Equipment Test Group, has been conducting the experiments.





Consolidated's TRANS-OCEANIC Project

A design for a 54 passenger flying boat of 110,000 pounds goes with all the comforts of a luxury liner.

ON previous projects, one hardly has to wonder if they think a little at the speed with which Uncle Sam's aircraft builders have been turning out bigger and better flying boats, with which to dominate the world's ocean air routes. We are now a little wiser and a little more certain to see what a commanding position American designers and builders have won only with commercial ocean aircraft, but with the huge long-range travel point loads in valuable in gaining the commercial air routes established. We have been kept mentally leaping from coast to coast during 1937 (and physically too) to keep up with developments. We've given storerooms in turn to the Boeing 244 in Seattle, the Sikorsky "Flying Dutchman" in Bridgeport, the Martin 166, and the Consolidated XP302V-1 in San Diego. But eliminating this busy year for boats, since the government late in De-

cember of the proposed Consolidated trans-oceanic flying boat, making the re-entry of the Consolidated company into the commercial field. Announcement of general specifications of this plane with detailed disclosure of other arrangements for passenger accommodations gives the prospective trans-oceanic traveler of 1939-40 a glimpse of the equipment he may expect to see. For in considering this flying boat the Consolidated Aircraft Corp. has indicated that it is willing to undertake construction immediately on a feet of such planes. It is said that more than 100,000 tons already have expended in preliminary engineering on this project. With trans-oceanic passenger flying rapidly increasing with speed, it is safe to estimate that Consolidated will shortly find its vast factory facilities sorely taxed to meet the demand for such ships, and that other American manufacturers of com-

mercial airplanes will be called upon to speed production in order to meet actual demand for trans-oceanic type planes.

Devices to provide luxurious accommodations for both day and night would be the fifty-four passengers and a crew of 160, the new Consolidated trans-oceanic plane will feature two main passenger decks on which will be located a total of fourteen passenger cabins arranged to accommodate from two to four passengers each. The upper deck extends straight back through the hull to the tail in which the galleys and cook's quarters is located. A dining hall on the deck accommodates twenty guests at six tables. On the lower passenger deck, which occupies the lower two-thirds of the hull, there are six passenger cabins, each roomy, clean, spacious, and a bathroom, cot-

ted lounge. A companion is provided through the length of the living quarters and communication at intervals with both lower and upper decks by means of short stairways.

In general design the Consolidated trans-oceanic flying boat is conventional, with a single hull in which is mounted the cabinover wing carrying the four engines. Wing flaps are retractable in flight into the underside of

the wing. The fuselage is approximately circular in cross section throughout its length, except for the boat bottom portion, and features a smoothly rounded nose in which the pilot's cockpit is located clear forward. Gross weight of the plane loaded is 110,000 lbs., wing span 143 ft. and top speed 230 mph. Detailed specifications as referred by the manufacturer are listed as follows:

Gross weight.....110,000 lb.
High speed.....30 mph.
It should.....25 mph.
Take-off speed.....100 mph.
Full load landing speed.....23 mph.
Service ceiling.....25,000 ft.
Time to climb to 10,000 ft.....21.5 minutes.
Rate of climb at sea level.....300 ft. per min.
Range: (Variable with load and wind.) For purposes of illustration we have taken figures showing maximum of range and

packed seating with 57 or.....1,000 miles with 10,000 lb. payload
1,000 miles with 20,000 lb. payload.

Take-off time at sea level.....10 minutes.

Rate: (Variable with load and wind.) For purposes of illustration we have taken figures showing maximum of range and

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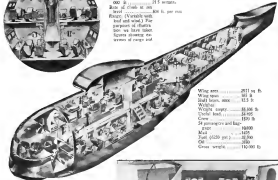
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Wing area.....2,111 sq. ft.
Wing span.....143 ft.
Hull beam.....43.5 ft.
Wingtip sweep.....34.5 deg.
Crew.....160
24 passengers and crew
2100.....10,000
Fuel (5250 gal.).....5,500
Oil.....200
Gross weight.....110,000 lb.

Shows a section through the hull floor for the day accommodations of the double-deck cabin.

Gives a section view of the 54 passenger boat showing arrangement of passenger accommodations.

Shows the cockpit lounge containing one of the lower deck.





The second of two articles

By
H. T. Byler



*Common Courtesy
and Common Sense*

are the essentials for

Successful Marketing "DOWN UNDER"

Some practical advice to American manufacturers who are ambitious to enter sales in the Americas below the Equator.

UNDER EXISTING CONDITIONS, South American commercial aircraft representatives cannot make a fair living solely by the sale of commercial aircraft. Many representatives have either made money, landed their activity in prison. It should be clear, therefore, that without some well-organized assistance from home efforts such representation is impossible. Merely expending a representation, and indulging in occasional correspondence concerning the despatch of correspondence and on the forwarding of messages in English is usually paid to much time and money without. Often the net result is only the reduction of the manufacturer's name on the small, representative's letterhead—if he has one.

The tactics connected with the sale of commercial aircraft usually involve both manufacturer and representative and may be classified by the following composite case which relates to the bargaining margin of Latin-American agents and their brokers to purchase through a representative. The project writes the history about his success in the equipment, is many years able to be represented by a representative in his locality and conducts a discount on the purchase price. The history may receive such replies as good English, terrible English, Spanish or Portuguese and usually replies to them stating that the manufacturer is already represented and requesting the project to contact the representative

(who may actually be almost at far away as the home factory). The project gradually receives his answer in about 60 days' time because it is probably both request and answer were sent by last mail. If the project understands the reply in English, well and good, but if the reply is in a local and misinterpreted poor contact is lost.

A suggestion allowed toward a letter contact on letters of inquiry is to make up a standard reply to letters of inquiry, and to it join Portuguese and Spanish speaking representatives for several months, with the proper heading, addresses, etc. in both languages. How it typed exactly by the representative using the proper characters in both languages. Even buy a special typewriter (an answer) with the proper characters and use one of your own typists (who does not necessarily need to know languages) to make up copies of these letters.

Letters should contain the following information to make everything clear to the project and avoid your representative in making his reply:

1. That the fact and cost price of aircraft are checked with either factory or representative, and the purchaser is given his choice with whom he wishes to deal.
2. If possible, give the price of the equipment in both American and foreign currency, noting that the price given is based on that day's

exchange corresponding with the date of the letter and that any down payment or balance must be made on the exchange the day the deposit is made through your banking connections.

3. Give all performance and data in the nearest types.
4. State only standard equipment. Personal expenditure should be made in making English equivalent the standard and special equipment is sometimes misinterpreted by project to mean that both are included in price of equipment.
5. Give a detailed list of your staff paid, naturally excluding any fees at all of entry.
6. Give an approximate delivery time based on receipt of down payment.
7. Suggest additional delivery order to take care of fast turn-over and give the cost of such a list of parts.
8. Acknowledge or explain poor accepted reason for payment, and explain whether it is cash with order, down payment, and balance against documents at factory, or with banking system in country of project's factory.
9. Suggest again the period and time help the representative can give to the buyer, if the contact is close enough to maintain representative's interest.
10. Send by air mail.

A follow-up letter by boat mail, made up in the same manner by you and your representative should also be sent. It is always well to remember that the majority of Latin-Americans are positive for ideas and contrary and that they love details. Taking advantage of these facts will never harm any company involved in promoting good will and sales.

The manufacturer's problem is without doubt the most difficult of all, because the manufacturer cannot afford to plan dissemination at the disposal of representative, and in most cases the representative or export agent cannot afford it. The most option is to appoint as representative the first purchaser of the equipment, which restricts the usefulness of the plan to a very limited area. Also if the purchaser happens to be an operating company, loss of profit may be incurred by taking the equipment away from its base. Under these conditions it is obvious that the solution to this problem is to restrict the territory allotted to a representative. If the appointment of representative by contract, country or large territory is made, it is obvious that the territory is sold through the representative's headquarters.

Export and sport rivalry between firms, countries, companies and individuals are commonly hot and do not the pleasure. A good example is the rivalry between the states of Rio de Janeiro and Sao Paulo. What the

wealthy Caracas knew in strength is mirrored again by the Paulista, and not versa. A commercial aircraft representative operating out of Rio will have a very tough argument attempting to sell his equipment in Sao Paulo, even if the equipment is lightly favored. Again, Sao Paulo's position has the same feeling, while Belo Horizonte, another population center less towards Rio. These four cities contain a big percentage of the total population in Brazil that can afford to buy aircraft. Under these circumstances it is obviously foolish for any manufacturer to be represented in the first series by a single individual or company, but that someone seriously exists to the detriment of the manufacturer.

One solution to the manufacturer problem is appointment of representative, by sales, or carefully chosen and restricted areas, or even up all profit to your present representative without demonstrating a order to back into the market.

Exchange is a necessary evil but in certain times it can be an advantage. The manufacturer that is interested in South American sales would do well to watch the market through his representatives. The obvious reason is that where exchange is favorable there is considerably more opportunity for making sales. For example, the aid price of American equipment is more stable over the period of a year, but

(This is page 81)

Consolidated being built here flying previously in the more recent biplane days. Many of these planes are being used by the Navy's "reserve" squadrons of equipment in the Navy Department Store. (Note: Consolidated contribution to the Navy's aircraft fleet is the high performance XPB2Y-1 low wing patrol bomber for long range operations.)



Consolidated XPB2Y-1

Navy's newest big boat arrived

REPRESENTING BATTLE OF CINCINNATI, the Navy's newest experimental "flying dasher" was unveiled in the plant of Consolidated Aircraft Corporation, San Diego, Cal. on Dec. 8. On this same day, the Navy started a new flight of four Consolidated PB2Y-1 type twin engine patrol boats from San Diego Bay which ended successfully the following day with the arrival of all four patrol boats in Panama after a record breaking 3000 mile trip. This flight served to emphasize the superiority of the new low wing patrol bomber to Navy pilots, for the reported flight of the PB2Y-1 from during 1947 have demonstrated how rapidly the U. S. Navy is approaching an ideal of a "strong fleet" independent of surface units. With the advent of the new four engine patrol bombers as developed by Consolidated and by Sikorsky, the Navy has available the equipment from which to build an in-

dependent air fleet capable of operating in any part of the world without relying on auxiliary ship tenders. Certainly no other country in the world has carried the development of the fast air fleet to far as has our own American Navy. And while we cannot publicly praise performance figures on the new Consolidated XPB2Y-1 it is obvious that while we have two types competing for Navy service and service contracts, no other country in the world possesses flying boats of this class.

The most advanced flying boat is available anywhere else in the world

not the Shore "Eagles" after converted boats. But these are not only inferior to the Consolidated and Sikorsky military patrol bombers, they are far exceeded in all-around size and performance by the new Martin Model 136 and the Boeing 314 transporters. With such a tradition of success in the development and operation of large flying boats already consolidated, it is reason-

Forerunner The first XPB

1928



AVIATION
January 1948

emerging from the NC boats of post-war days, there is reason to hope that our American designers and pilots will give the necessary support



Above—Location of retractable wingtips. Right—Details of the XPB2Y-1 tail.

to our designs over ocean air transport lines to further emphasize the dominant position already occupied.

When the Sikorsky Navy patrol bomber was launched recently it was aptly dubbed the "flying dasher". No better term could be applied to the Consolidated boat, which is a sister of the Sikorsky as to general size and arrangement. No official information on armament is available, but it is obvious that the Consolidated can save transmission loads loads in low wing,

giving her doubly striking power. Gun turrets front and rear provide ample defense against attack in the air. Guns of the "main" class will probably be mounted in order to conserve ordinary turret armament. This protection, plus the high speed of the ship, should make the new boat relatively invulnerable to attack in the air.

In general arrangement the Consolidated XPB2Y-1 is a fast engine



single tail monoplane flying boat, with the wing mounted directly on the hull and the engines carried in nacelles well forward of the leading edge. Removable wing tip floats are provided, improving the speed of the plane in flight, for the wing is full streamlines, as are the tail sections, making this plane by a good margin the "fastest" low wing boat arrangement that has yet

been built. Construction is of metal throughout, with stressed skin aluminum alloy design preference, as, although dural, aluminum, and steel control surfaces are dural control. The hull has been finished inside and out with the latest developments in corrosion proof paints to make it practicable for the boat to operate away from the base for the extended periods of time. Interior hull finish is in aluminum polished paint. Perfect provision for adaptation operation is the complete provision for the crew. This includes the independent 111 volt generating system which supplies AC current throughout the plane, a complete radio-communicating telephone system throughout the plane, complete sleeping and living quarters with cinder lockers, toilet and washing facilities, refrigerating, heating and ventilating system, and a complete galley equipped with electric stoves and refrigerator. The plane is also fitted with landing gear that can be quickly retracted in the interior of the fuselage, and with a complete system for routine maintenance work in flight, or at rest away from the base. It would appear that this ship could "fly right on pins" so long as fuel is kept in the tanks. An important feature to increased long range operation is the special reception tower at the wing in the top of the hull.

Performance data have been withheld but it is claimed that the plane will show exceptional speed, and the range is removed in its remarkable, even in this era of long range flying boats. After flight tests are made, probably during December, the boat will be flown to one of the United States Naval air stations for extensive service testing.



AVIATION
January 1948



VULTEE Attack Bomber V-11GB

American military type wide
lower in the foreign market.

American commitment in the field of design and manufacture of aircraft for the world market has been recently demonstrated in the wide popularity which has been won by the V-11GB attack bomber, manufactured by the Vultee Aircraft Division of the Aviaton Manufacturing Corporation. The Vultee factory is dividing its output facilities in the manufacture of a single type plane for the foreign market.

Emphasized in the design of the Vultee are the latest American developments in streamlining, wing design, engine, engine cooling and drop bomber equipment. Through a careful balance of these design methods, in the various parts of the plane, plus other allied developments in methods



of riveting, bolting, and covering parts together, it has been possible to build a more efficient airplane from a pre-fabricated standpoint, and one more durable and sturdy than most current comparable foreign designs. Even a maintenance standpoint, the Vultee strikes as a ship that will deliver more hours in the air and less in the shop than most any foreign equipment with which it might be compared.

Current orders for the Vultee attack bomber total an over one hundred planes which, with spares and equipment, represents a backlog of more than \$5,000,000 as the backlog of Vultee Aircraft as of December 1, 1941. With plans now on order from Russia, China, Turkey and Brazil it has been necessary to expand plant facilities and payroll. When the production commenced in 1942 on the V-11, single engine transport there were 30

people employed and operations were conducted in a single hangar on Grand Central Air Terminal, Glendale. But now production is carried on in a modern aircraft factory located on the



Slide bolted into



Slide bolt into tail of bomber late model at 4000000 "Vultee" bombers

Bom's own flying and flying field near Downey, California. With completion of a new \$200,000 expansion program, the plant covers 125,000 square feet of floor space, measures overall 500 ft. by 300 ft. In this plant 100000 bomber employees work two full

shifts a day producing a plane per week at the present rate.

As a military weapon the Vultee is equally adaptable to use as an attack plane, light bomber, or reconnaissance and photographic mission, and may also be used as an auxiliary plane.

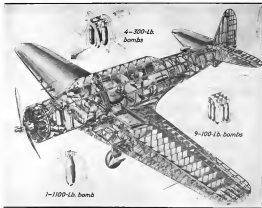


Previous to use for training four load guns firing forward and two anti-aircraft machine guns. Bomb loads are variable to include twenty thirty pound bombs, ten one hundred pounders, four of three hundred pounders, or one eleven hundred pound bomb. Performance with the Wright Cyclone GR-1820 G2 engine of 850 hp and Hamilton-Standard constant speed propeller includes a top speed of 230 m.p.h., maximum range with military load of 2350 miles.

Structurally the Vultee is all metal, made of Alclad sheet. Fuselage is circular in cross-section of monocoque design and is built up solely of flat sheet formed to backbone. The wing is of semi-strut type incorporating a modified cantilever of box form with two corrugated shear webs and top and bottom caps formed by corrugated sheet.

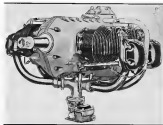
(Continued on page 11)

Left: Detail of bomber nose structure and wing structure. Right: Bomber with damaged engine.



AVIATION
January 1942

AVIATION
January 1942



Continental A-50

W. M. Tilley, Continental's Chief Engineer, presents details of new 80-hp. light engine

FOR ANSWERS TO YOUR SEARCH FOR more power in the light airplane comes from Continental Motors whose A-50 engine has provided a better percentage of the low price airplanes built to date. The new offering is the A-50 model in three series. Series 1 has one Spark plug, suggests a pressure of pump and tachometer drive. It is of the dry sump type with water pump to gravity. To full export requirements a second magnet is added to the Series 1 engine which makes it the Series 3 Battery Ignition and more complete accessory equipment are characteristics of the Series 2 variation. Typical for this series includes (a) Auto-Lite or Spark plug system drives, the Edge motor and Edge or Auto-Lite governor, carburetor and pressure of pump, and A.C. automatic fuel pump, radio charging, and tachometer drive. Rating is 80 hp. at 1500 r.p.m.

The increase in power has been obtained for virtually the same weight as the A-40 engine. Fuel consumption at rated power is 21 gal. per hr. for 85 percent level flight r.p.m. at 10,000 feet is less than our past per hr. Complete testing is provided against old designs and types. Each cylinder has a single rocker bar enclosing the two overhead valves.

Unit valves which are located in the longitudinal plane of the engine. The rocker bar cover is a light die casting fastened to the cylinder with six bolts and nuts. Angle area of cooling fan on exhaust port combustion chamber and spark plug leaves nature adequate cooling. Air intake, buffer or cooling air required to move cross flow of air over cylinder head between valve ports. Cooling fans absorb little difficulty in building maximum head temperatures below 400 deg. F. and cylinder base temperatures below 200 deg. F. and 75 deg. F. cooling air.

The front forged steel cylinder barrels are removed and struck into the heat treated Alcoa cast aluminum alloy head, valve seat inserts and spark plug insulators are of aluminum bronze, and valve guides are bronze. The combustion chamber is of valve-in-head type with the two Johnson valves in the flattened narrowed crown of the dome. Spark plug sits between the valves in ports extending into the combustion chamber to avoid possible oil leakage from the ports. Each valve is operated by a rocker arm, a push rod and a Wilson-Rich hydraulic tappet—all enclosed and sealed against external oil leakage. Engine oil under pressure at circulation into the tappet through the push rod and rocker arm to the rocker arm

looking and to the valve tip. Splish over the valve stem and guide. Oil is returned to the combustion via push rod bearings. The cylindrical sand tappet has a flat faced, hardened end that beats directly on the stem.

The crankshaft is run of Durolite by Clegg-Wyatt and Cannon and has hardened turn and journals. There are six cranks, three journals and six balancing weights at the propeller end to operate the tail pump. At the rear end is a flange in which a gear is marked by experience.

The forged alloy steel, one piece, four throw crankshaft is supported by steel-bushed main bearings at the ends and both ends. The crankshaft is drilled for lubrication and to provide pressure of lubrication of crank pins. Five thrust faces are formed on the propeller and drive and on a shoulder near the propeller so that these surfaces can be used for either motor or pump installation. The propeller drive and customer with No. 107 taper, S.A.E. Approved. Standards. On the opposite end of the crankshaft is a flange to which is fastened, by screws, a spur gear to drive the camshaft and accessories.

The crankcase is a two-piece, heat-treated Alcoa aluminum alloy casting bolted together at the normal length with pins through crankshaft and camshaft. Rigid transverse webs hold the base as a bearing and the three crankshaft journals. A Chicago screw hole web prevents oil leakage at the propeller. The large tappet guides are formed in the crankcase in a plane below and parallel to the cylinders. Cast as longways tubes lead all water passages to the tappet guides, the crankshaft and the main bearings. Four major screw holes for 8 mil. bolts are provided at the rear of the crankcase to tie in other engines. (Turn to page 47)



Power curve of A-50 rating 80 engine fuel.

I am NC 18111...

DOUGLAS BUILDS PUBLIC ACCEPTANCE

As well as Airplanes

DOUGLAS

DOUGLAS The Built of Temperance

It's Smart to 'ARRIVE DOUGLAS'

IT'S SMART To Go Douglas

DOUGLAS leadership impresses a responsibility that does not end with the manufacture of airplanes. Geared to production is a program of national promotion supporting the industry. So, at the rate of one a day, Douglas transports come off the production line into a friendly world. Here is a part of the past year's national magazine advertising program.

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- FOR TAKING OFF
- FOR CLIMBING
- FOR CRUISING

EXPERIENCED PILOTS know that a balanced positive means better all-round performance . . . economical warm-up, quicker throttle response, greater cruising range.

Shell research has developed for you balanced aviation gasolines with octane ratings from 73 to 100. This new balanced fuel means quicker starting, more

"pew" during the take-off and climb, and, in addition, lower fuel consumption.

For complete information on any of Shell's line of aircraft petroleum products, write to the Shell Aviation Department, Shell Building, San Francisco, California; or Shell Building, St. Louis; or 50 West 50th Street, New York City.



AVIATION
January, 1937

26

A New SEVERSKY for the EXECUTIVE

Fulmer's Bendix winner and Jimmy Doolittle's new job opens up new possibilities for the fast moving business man.

DIMENSIONALLY EXCEEDED the record progress of American aviation, the Seversky Aircraft Corporation has offered a commercial version of the Seversky plane with which Frank H. Fulmer, Jr. won the 1937 Bendix race. An advanced in test month's race, Jimmy Doolittle has just taken delivery on one to speed up Shell's business. Designed as a three place cabin plane, the commercial

Seversky is known as the "Executive" model and is rated at 340 m.p.h. at 15,000 ft. altitude using the Pratt & Whitney two-row Whisp engine of 1200 h.p. At this point we find it noteworthy in paint and powder for a moment the spectacle of our leading aviators dashing about the country at 340 m.p.h., or at a cruising speed of 215 m.p.h., which is fast about 50 m.p.h. faster than our scheduled air transport. It is a little startling, especially in our section with a range of 3,700 miles. But when one considers that the plane is basically of the same type as the Seversky which have won thousands

of hours as serving with the United States Army Air Corps it becomes apparent that the practical 540 m.p.h. private airplane is really here. Although the Seversky "Executive" is not a plane for the novice, it should certainly be thoroughly practical and reliable in the hands of the average experienced pilot. In the Bendix race Frank Fulmer, himself an aviator pilot, triumph of long experience, read against a number of seasoned race pilots flying special racing equipment, and he not only won the race, but established a new Bendix record both for the race from Los Angeles to Cleveland, and for the full transcontinental distance. In structure and assembly, since from the Seversky "Executive" clearly follows previous models, of all-metal construction with skin stressed wing, monocoque fuselage, retractable landing gear and split type landing edge flaps.

Specifications supplied by the manufacturer are as follows:

Wing span	36 ft.
Overall length	25 ft. 8 in.
Overall height	9 ft. 8 in.
Wing area	350 sq. ft.
Empty weight	4,150 lbs.
Gross weight	7,800 lbs.
Gross weight (maximum)	6,712 lbs.
Engine	1,200 h.p.
Oil capacity	45 pails
Propeller	36 inch
Pratt & Whitney two-row Whisp	1,200 h.p.
Maximum speed (15,000 ft.)	340 m.p.h.
Cruising speed	215 m.p.h.
Rate of climb	3,000 ft. per minute
Service ceiling	15,000 ft.
Altitude ceiling	10,000 ft.
Climbing range	2,700 miles
Short maximum cruising range	3,700 miles



Doolittle will have to do a good deal when he flies his new Seversky "Executive." A sporty view of the cockpit.

AVIATION
January, 1937

27



Seven-Cylinder LYCOMING

New R-550-D series supplements established line of nine-cylinder engines.

LYCOMING ENGINES meet a new field with the announcement of the new seven-cylinder R-550-D series engines by the Lycoming Division of Avco Corporation. Based on the proven features of the well known Lycoming R-680 nine-cylinder engine, the new seven-cylinder models are rated at 219.25 hp. for take-off, and 190-200 normal moderate boost power.

Design features of the new seven-cylinder series are based on the service experience with the R-680 engine, and the record of more than one hundred million miles of flight with various models of nine-cylinder Lycoming engines. Incorporated in the R-550-D series are the same features recently approved in the nine-cylinder engines, notably, completely automatic valve gear lubrication, greatly increased cylinder heating, and provisions for standard accessory drive equipment. Valve gear lubrication is accomplished by pressure engine oil metered through the cam followers and push rods in the valve stem levers.



A view of the propeller end.

ing. The power of thrust through the push rod linkage and material of fuel connecting adjacent rod



Accessory equipment of the R-550-D engine.

bolts, in the engine oil pump. Particular care has been taken in the design to assure complete drainage of each cylinder box during engine idling periods on the ground and when the engine is stopped. New overhead valve boxes are made off right by using gaskets and covers secured to each cylinder box by four studs and nuts. The complete construction of push-rod linkage, coupled in the rod end with a rubber sleeve and at the intermediate with special rubber hose and clamps, prevents oil leakage at these points. Complete elimination of manual lubricating permits these engines to operate for periods of one hundred hours without maintenance attention.

Cylinder cooling is improved through use of larger fan more closely spaced. Dies, together with tank, slanting direct cylinder air baffles and new exhaust

ports, permits operation at considerably lower engine temperatures and with more uniform cylinder cooling under all operating conditions. Additional cooling, as well as greater strength is also provided through use of a new ribbed piston.

Standard equipment of the Lycoming R-550-D series engines include the following accessory drives, which are grouped on the rear crankcase without so as to provide convenient accessibility; one dual pump magnetic, water, generator or fuel pump, and tachometer drive connection. The dual No. 20 centrifugal and pressure connections of fuel or Lycoming mechanically operated controllable propeller. Other equipment furnished with each engine includes: Governor, No. 10-11 single-barrel carburetor, pressure type oil cooler baffles, booster oil connection to the fuel distributor, dual pressure connections to top three cylinders, propeller attaching pins, remote fuel kit, and engine operator's manual. Individual type radio shading and dual tachometer drive are available as special equipment.

Specifications

Important specifications for the Lycoming R-550-D series are:

Model designation: R-550-D, R-550-D Type—Direct drive, single row, radial air cooled.

Number of cylinders—seven—cylinder bore—41 3/4—41 3/4 in.

Piston displacement—41 3/4—41 3/4 in.

Stroke—5.012 in. —3.912 in. in.

A.T.C. Number—561, 142

Compression ratio—15 to 1—14 to 1

Best speed for take-off with standard propeller—2200 rpm—2200 rpm

Best normal speed—2000 rpm—2000 rpm

Best take-off speed—2200 rpm—2200 rpm

Best normal speed—2000 rpm—2000 rpm

Best take-off speed—2200 rpm—2200 rpm

Best normal speed—2000 rpm—2000 rpm

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Best normal speed—2000 rpm—2000 rpm

Best take-off speed—2200 rpm—2200 rpm

Best normal speed—2000 rpm—2000 rpm

Best take-off speed—2200 rpm—2200 rpm



A RECORD YEAR for WRIGHT

The Wright Aeronautical Corporation has just completed the largest year in its history. During 1937 nearly 2500 Wright Cyclones and Whirlwinds were sold—and deliveries were increased approximately 30% over 1936.

Wright takes this opportunity to thank all who contributed so generously in making this record possible—the U. S. Army Air Corps, the U. S. Navy Department, commercial and military aircraft manufacturers, commercial airlines of the United States and abroad, and private owners of Wright-powered aircraft.

The U. S. Army Air Corps alone purchased over 1200 Wright engines during 1937. Wright Cyclones power all of the latest Boeing Super-engineered Army Bombers, Douglas-engineered Army Bombers, Curtiss twin-engine Army Attack Planes, North American Army Glider-torpedo Planes and Grumman F4F-2 Navy Fighters also Martin Export Bombers, Curtiss Hawk 75 Pursuit Planes, Vultee Attack Bombing Planes and many other types of military aircraft.

In the commercial field, all of the American Douglas DC-2 and DC-3 Day Planes and Stinson Planes now in service on American Airlines, Braniff Airways, Eastern Air Lines, Transcontinental & Western Air, Pan American Airways System, KLM (Royal Dutch Airlines), Swiss Air Lines, Australian National Airways and many other leading airlines throughout the world are powered by Wright Cyclones.

"Fly With Wright the World Over"

WRIGHT
AERONAUTICAL CORPORATION
PATENTON NEW JERSEY

A DIVISION OF CHRYSLER FINANCIAL CORPORATION



Aircraft CAREERS in the making

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can you have all these outstanding advantages--

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• **Exclusive Courses**—The lessons used for both the resident course and the home study portion of the home-and-shop course contain material never before released by the industry. Exactly what is required of an employee in an aircraft plant is provided by the courses.

• **Vast Shop Equipment**—Virtually a complete aircraft plant is duplicated in the 20,000 square foot shop-training building. It houses the most extensive group of standard and advanced production equipment ever provided for student instruction.

• **Nationally Recognized**—Aero I.T.I. has been acclaimed by civic, industrial and vocational leaders, editors, press services and leading journals because of the unusual opportunity it offers men anxious to enter the aircraft industry—with a background of training unmatched by its thoroughness.

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AVIATION
January, 1956



The Explorer

New ship designed specifically for
aerial photography and mapping



Few many years ago aerial survey work has been done with equipment designed originally for some other purpose. A long time ago Tibbitt Aircraft, (Aberdeen, Alaska) Survey) got the idea of designing a ship especially for the purpose and two months ago a real conversion was started on "The Explorer" which was flown for the first time last November. Among the features are exceptional forward and downward vision, rapid climb to high altitudes, high cruising speed, stability, fuel capacity for at least eight hours, supercharged engine, and an oxygen supply for the crew.

Publication of the existing equipment demanded a pilot's position in the nose. A podner propeller and outboard motor recently followed and today on the ground reflected the true wheel maintenance. Vision is also enhanced by the slant sweepback of the wing. Efficiency is increased by the specially streamlined form of the fuselage and the V.T.C.A. cooling.

Guideline construction is of welded steel tubing with stressed skin. The wing is a full cantilever, of monocoque steel tube construction. Monocoque dorsal construction is used for the boom.

The propeller is so close to the ground that no steps are required to enter. One door is provided on each side opening directly into the pilot's or camera man's seat. A door within

the door permits the camera man to take photographs at an oblique and forward angle without leaving the entry door. A hermetically sealed mapping podhole is built into the floor of the podhole. Accessibility of the cabin for supercharging is provided by making in the safety glass which serves as windows and in the outside covering of the podhole.

The first of these ships is powered with the Wright J-4-B T. 300 hp engine with adjustable propeller. Provision has been made for installation of a 400 hp engine. Subsequent models will be designed for engines up to 1,000 hp.

Development and manufacture of this airplane is in the undertaking by the newly formed Albion Air Cyclic Corp. of Lansing, Mich., of which Tibbitt Aircraft is president. Kenneth Beman is chief engineer, and Walter Carr is test pilot.

Aero	
Wingspan	271
Length	14.5
Height	12.25
Wings	207
Engine	312
Fuel	7.06
Radio	650
Weights	
Gross	2,800 lb.
Empty	2,100
Loaded	3,000
Maximum	1,100

Sea and Air
Cabin

Performance	
Maximum Speed (Sea Level)	181 mph
Cruising Speed (Sea Level)	140 mph
Service Ceiling	10,000 ft.
Climb Rate	1,200 ft./min.



AVIATION
January, 1956

A study of the principles of the

WILFORD GYROPLANE

as applied to a thoroughly modern design for a conventional airplane.

By Elliot Doland

Engineering Aircraft Specialist 214



PRACTICALLY ALL AIRCRAFT today are designed for a specific and definite purpose. It is obviously untrue, therefore, to continue on and find any one type in favor of another, for there are certain events for which one type is better fitted than for others. The data presented in this article have been compiled primarily to furnish light on the various possibilities of a thoroughly aeronomically sound type, to show some light on how the Gyroplane (a rotating wing aircraft) with rigid, self-lifting blades, as contrasted to the rotor type, with freely hinged blades under the Corio

Antony patents—EOL compares with the conventional airplane from the point of view of ultimate performance. As the basis for the study the Corio Wright 198 monoplane was selected as representing a production machine of thoroughly modern design and construction with exceptionally good performance. Keeping the same fuselage, landing gear, tail surfaces and power plant (120 hp.) and the same gross weight (2,400 lb.) three modifications of the original machine were considered, as follows:

Case 1. The machine converted to a standard Wilford Gyroplane with rigid,

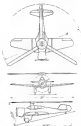
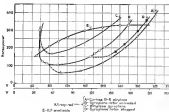
self-lifting rotor. Sweet type of the rotor, 112 ft. in length, with fixed wing area reduced from the original 324 sq. ft. to 104 sq. ft. Angle between the wing and the rotor such that the rotor is naturally inclined at an air speed of 130 m.p.h. The rotor weight of the aircraft is carried by the fixed wing but the rotor continues to turn at stalling speed.

Case 2. Conversion to a whirling type gyroscope with the rotor feathering range (covering 1120 m.p.h.) the rotor designed to carry all the load at all speeds.

Case 3. Conversion to a Case 1 to a gyroplane with fixed wing but incorporating arrangements so that the rotor may be swung to right.

Performance characteristics for the original airplane and for the three modifications have been calculated and are presented in the accompanying table. Basic assumption for all calculations is that the weight of the step is carried by the constant force on the wing or rotor and that the resultant velocities are divided into horizontal and vertical components. The power required curves are shown on the chart. Curve A is for the basic airplane, Curves B, C and D are for Cases 1, 2 and 3 respectively.

Type	High Speed S.P.H.	Loadng Deg	Landing Speed Components	Speed Range (100-200 ft.)
A. Airplane	284.2	12°	30.9	5.82
B. Case 1				
Gyroplane	115.9	20°	30.4	5.52
Rotor Unfolded		20°	31.5	5.50
C. Case 2				
Gyroplane	186.1	30°	31.52	4.58
Gyroplane		30°	31.1	5.72
D. Case 3				
Gyroplane	190.8	28°	32.8	6.22
Rotor Stopped		30°	32.3	6.16



AVIATION
January 1928
45

SIKORSKYS *join the Army*

Adding range and scope to the United States Army Air Corps' complement of dual-purpose aircraft, five giant S43 amphibians have now been delivered. Important roles in defense are being assigned to these versatile Sikorskys. Equipped with Pratt & Whitney Hornet engines and Hamilton Standard propellers, the S43 is an all-United product.



SIKORSKY
DIVISION OF UNITED AIRCRAFT CORPORATION, BRIDGEPORT, CONNECTICUT

AVIATION
January 1928
45

Hamilton Standard Presents

another outstanding propeller achievement... the HYDROMATIC full feathering—constant speed Propeller.

Already in quantity production* for the United States Army Air Corps, American Airlines, Pan American Airways, TWA, and United Air Lines, the HYDROMATIC is a worthy successor to earlier Hamilton Standard achievements—the Controllable Pitch and Constant Speed Propellers.

Hamilton Standard Propellers
East Hartford, Connecticut
Division of United Aircraft Corporation

* Restricted to use in the United States for the present.

Aircraft Radio

New Equipment for Communication and Navigation by Henney and Flah



Western Electric Rotatable Loop

THE WESTERN ELECTRIC COMPANY announces a new shielded loop antenna for aircraft, suitable for use as a remote control unit. Designed primarily for use with the Western Electric 14 and 20 type receivers, the new loop is also applicable to other types. The shielded design factor enables taking in radio bearings by rotating the loop. Position of the loop is indicated on the control unit by a needle on a scale permitting accurate loop adjustment.

Fairchild Direction Finder With Streamlined Loop

FAIRCHILD VORON LUNDA CORPORATION, pioneer aircraft radio equipment, here announced an improved model designated as the Fairchild RC-4 Radio Compass. Of special note is the newly added shielded loop antenna, completely enclosed in a streamlined housing. The complete loop assembly with housing weighs ten pounds less than the loop assembly alone is formerly used. The loop rotor mechanism is simple, rugged and lighter in weight with a remote control head which can be mounted on

the instrument board, or wherever is most convenient for the operator. The degree of rotation shows directly on a dial on the remote control head. A 15-tube receiver replaces the 8-tube unit used in previous models without any weight increase. The new receiver has a reception range of 300-400 miles over a continuous frequency range of from 170 to 1200 Kc. of tone bands, plus greater selectivity and sensitivity. Through several improvements a high degree of resistance to radio activity has been secured regardless of radio or signal modulations.

The complete Fairchild RC-4 Radio Compass includes: 1) tube superheterodyne radio receiver with shielded receiving; 2) loop antenna of streamlined housing, in new loop rotor and dust, remote control box; compass (optional dial); dynamometer, and complete

set of connecting cables and mounting box. When desired the set may be furnished with fixed loop. All features of previous Fairchild radio compass models have been retained, such as: 1. Frequency for continuous visual indication of bearing simultaneously with aerial reception through amplifier. 2. High sensitivity which permits visual indication at a distant radio transceiver in operation on the radio-phones, or when static conditions make aerial signals indistinguishable. 3. Complete operation from the pilot's seat by means of remote control. 4. Operates on either commercial broadcasting stations or established army radio stations.

FCC assigns ultra-high aircraft frequencies

THE RECENT ACTION of the Federal Communications Commission in assigning frequencies in the ultra-high spectrum has provided aviation radio with badly needed new territory in the ether. The new allocation, which was made from the hearings held on June 19-20, assigns a total of 125 channels in the region between 30 Mc. (10

(Continued on page 46)

Installation of the Fairchild Compass (A) in cockpit (B) shows RC loop before the loop housing is shown in the lower photograph.



Buyers' Log Book

What's New in Accessories, Materials, Supplies, and Equipment



Low Speed Drill

Black & Decker unit designed for standard steel

With one more application of standard drills to aircraft steel there is particular interest in the new low speed hand drill offered by Black & Decker. This unit has a capacity of 1 in. standard full length steel of 100 psi and weight of 44 lb., and overall length of 15 in. The drill works from standard voltages. For drilling in hard metals a slow speed bit is essential, making the new Black & Decker tool a real contribution to efficient hand work.—*AVIATION, January, 1937*



Black & Decker Low Speed Hand Drill

Cuts Snow Glaze

Adhesive liquid can be applied to window glass

Now that the snow season has started, it's up to them to make it less than snowbirds may make it seem of our best people. It is well known that during winter months extensive glaze is experienced on buildings of metal in open fields where large quantities of snow are present. Such a condition exists on many surfaces, aircraft, auto bodies, and countless other field structures. Inquiries about the hazards have resulted from this glaze. For this need be no longer as Insulake has been developed by the Raytheon Company at Cleveland, Ohio. Applied to the inside of outside of windows, Insulake is a pale green adhesive liquid which reflects one-seventh part of the light but reduces it to a soft uniform diffuse practical brightness. Insulake, therefore, Insulake will remove the glaze and

removed with hot water and a stiff brush.—*AVIATION, January, 1937*

Protectoid in Aeronautics

Cellulose product finds application in weathering weather

A new use for Protectoid, thermoplastic impregnated material manufactured by the Cellulose Corporation, 30 East 40th St., New York, has been found useful by the U. S. Weather Bureau. By using protective layers of Protectoid over a weather strip during air operations in so many in the different heavy planes and other operating personnel find a new aid in weathering the weather.

"Soft" Mallet

Tool sets vary in weight but suit in size

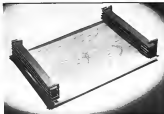
ONE OF THE MOST IMPRESSIVE TYPES OF HAMMER used in the aircraft business is the "soft" mallet. Recently Van-

derbilt Company, 20 E. Jackson, Chicago 31, has combined a set of special composition mallets with the unique property of varying weight without varying size. Known as the Soft-it mallet, these tools provide a uniform mass uniform weight equipment. The hardness of the mallet head composition may also be varied, permitting the purchaser to select the weight and hardness most suited to his needs, without sacrificing size.—*AVIATION, January, 1937*

Footlock Socket Seal

Rubber Collar Protects Electric Lamp Sockets

ON PARALLEL LAMP HOLDERS in application where electric lights are subjected to the action of weather, a new socket rubber collar has been developed by the Footlock Socket Seal Corp., Porters, Ohio, to prevent the entrance of foreign matter into the space between lamp base and socket. Known as the Footlock Socket Seal, this rubber collar fits over the open end of the socket for medium base lamps, so that when



Protectoid sheet weather seal in clearing air stream

AVIATION
January, 1937



NEW...YET TIME TESTED & APPROVED

The champion of 1937 racing and already a veteran of regular service, the Menasco C654 engine has been 2 years in development. It brings the stamina, efficiency and smoothness of Menasco power to a new field which several prominent aircraft

manufacturers recognize in specifying the C654 for 1938 models. It's in-line, inverted, aircooled and supercharged. Develops 250 h.p. at 5000 ft and 230 h.p. for take-off. Menasco Manufacturing Company, 6814 McKinley Ave., Los Angeles, Calif.



AVIATION
January, 1937
41

50

Who's Who in This Month's News



Success is no novelty to Jacqueline Cwikwa. Last month she added another classically to her laurels: Taking off from Floyd Bennett Field on Dec. 9 in her Cessna 441, she landed in

Jack Welch will have to get used to running his hands on a disk. After logging 2,000,000 calls—probably more than any pilot in the world—he has retired from active flying to become director of United's public educational program, with headquarters in Chicago. Jack learned to fly at Killeburg Field in 1917, becoming instructor at age 16. He was in the Army corps. Then out for an engineering job after the Armistice, he had only seven days of active service. Chicago-based has since the U. S. mail service in 1919. In 1921 Congress was reorganizing abandoned.

Yusef Mamuni, youngest of the Flying Shamals, takes a record last month. Accompanied by his flight instructor, Col. Arthur Brown, he sets a Nevada altitude record of 22,917 miles at an average speed of 302.24 m.p.h., thereby breaking three international speed records. The flight was made in a modified, low-wing, low-boom, high-altitude aircraft, built by half-Japanese designer Gen. Tadao Yamaguchi, former leader of a radical underground flying team that was disbanded after the war. The aircraft, called the Flying Green Dragon, is a two-seater, 100-h.p. Yama-Motor. The pilot found Yusef in the race to become a pilot and has now added another pilot to his stable of flying instructors. The two instructors, a record four, are in this country, having served some months with a bombing squadron in Ethiopia. Not all of the press is so kind. "Flying Green Dragon," says the *Los Angeles Times*, "is a piece of the 'unpleasant sport' of bombing. I remember that one group of bombers even set the impression of a bombing run as the basis for a 'dog fight'."

Bill Auer takes on one of the old men of airport construction in spite of his mere 43 years. Over 30 years ago he was working with the Post Office in building its airports at Bradley Field, Egleston and Cleveland. Since then Mexico, Omaha, Burbank, Washington, Los Angeles, are a few of the score of cities he has helped on their airport problems. Last month he joined Hyman-Harris, New York building construction, as manager of their new airport department.

A smart power man named **E. Wilson Smith** has been made assistant to President Jack Flyn of TWA. His new role is the part of an illustration of the training awarded to today's aviation personnel who work toward executive jobs. Smith took a Bachelor's and Master's degree in engineering at Iowa State College, then his Doctorate at Columbia. He has held transport pilot, aircraft and engine mechanic's, and radio operator's licenses. At present Smith is also a professor in mechanical engineering at the College of the City of New York.

Propellerman Frank Guidwell has been elected Vicepresident of the N.A.S. Interested in his specialty since his REVE days, he has served increasingly in chief of the propeller department of the Curtiss Aeroplane & Motor Co., chief of the propeller engineering division of the Army Air Service, chief engineer of Standard Steel Propeller Co., and engineering manager of Hamilton Standard Propellers. His contributions to the motor brought him the 1935 Rand Award, the 1937 Collier Trophy

Sentamu Jacobs, author of aviation's pioneering book, has worked off and on the fly since Alvin Karp Award. At 35, this is his second scientific recognition (he won the Wright Brothers Medal in 1982). Last month the Institute of the Aeronautical Sciences named Jacobs "for his contribution to the aerodynamic improvement of aircraft used in modern military and commercial aircraft." The work was at his wing form designs has boosted safety and performance, thus making his NAACP work as an "outstanding contributor."

Remondet Clark was once a Lieutenant Commander in the Navy. Now he has been made vice-president in charge of the surplus divisions of United Aircraft Corporation. After graduating from the Naval Academy, Clark served with the Navy from 1934 until 1939, receiving the Naval Cross for Distinguished Service in Uniform during the war. After sixteen years with E. W. Bliss Company, he joined the Remondet Aircraft Division of United in 1955, as assistant general manager.

Captain E. E. McWhorter, in first command position at the aircraft carrier "Yorktown." The Navy's latest post has been under his command since its first seaborne trials. Captain McWhorter graduated from the Naval Academy in 1946, saw wide and varied service with the fleet until 1951 when he went to Panama for flight training. He has served as Chief of Staff of the Aircraft Landing Force, a member of the Aircraft Base Force Staff, Chief of Staff, Aircraft Battle Force, and commanded the Cross Role Base



NEAREST TRICK OF THE SEASON: Carl Chader, chief test pilot for G. J. Whitney, Inc., of Floyd Bennett Field, demonstrating one-armed flight over downtown New York. With two assistants and 900 gal. of gas, the Beech Model 42 transport took off from Floyd Bennett United one of its 1935 biplane engines, presented to it, since New York, made a round trip to Philadelphia.

Reswin Lists Sales

The Reswin Securities Model 19000, powered with the Mooney C1 125 hp engine is now in production. The first distributor delivery was to Troy Air Service, Troy, N. Y. and two are to be shipped to Adrean Flying Services, Johannesburg, South Africa during December. Recent domestic distributor deliveries include Wm. F. Carter, Albuquerque, N. M.; Midwest Airways, Milwaukee, Wisconsin; L. A. Friesen, Evans City, Missouri; Douglas Howell, El Paso, Texas; Rev. A. J. Spurr, Okla-

homie City, Oklahoma; Dr. E. W. Wood, Rockly, W. Va.; Aircoff's Associates, Long Beach, Calif.; Cheyenne Air Service, Greenwood, Miss.; Southern Air Service, Memphis, Tenn.; Troy Air Service, Troy, N. Y.; W. C. Sales, Kansas City, Mo.; and Glasgow Airways, Glasgow, Scotland.

Reswin distributors have been expanded recently to Adrean Flying Services, Johannesburg; Aer. Ten Comercio, Capetown, South Africa; Tri American Aviation, Buenos Aires, Argentina (2). The second shipment to Tri American was equipped with Ede Suda.

SCHOOL HIGHLIGHTS

IN THE RAPID GROWTH of its enrollment, the American Glenn L. Martin School of Flight, N. Y., has moved into new quarters in a modern factory building, 15,000 sq. ft. of floor area are already in use. An exact copy is available for future expansion. A complete shop is being installed. A project of the New York Board of Education, construction costs only less dollars in saving out of textbooks, supplies for students, and Earl Scudlark, well known official of the National Soaring Society is Supervisor.

LESLIE G. RAY CHAMBER, wartime pilot and an instructor of more than six years' experience, has become Chief Instructor of Sky Flight, Inc., at Roosevelt Field, L. I. He will be assisted by Rex Oppenheimer.

THE HARRIS (formerly's school of business administration, Wednesday, May 1, will run a "Business school of the air" next June to August for a select group of executives and young men about to start on business trips. The party will spend their leisure time visiting all around Latin America as Pan American and Pan-Atlantic airlines, "waiting conditions."



COMMERCIAL DELIVERIES

AVIATION's summary of airplane marketing for the month ended Dec. 9, 1937

Production and Number of Units	Model	Type	Manufacturer	Engine Make and Model	Production and Number of Units	Model	Type	Manufacturer	Engine Make and Model
A. E. Smith, Inc.	Model 10	Trainer	Smith	Continental 4	A. E. Smith, Inc.	Model 10	Trainer	Smith	Continental 4
B. F. Goodrich	Model 10	Trainer	Goodrich	Continental 4	B. F. Goodrich	Model 10	Trainer	Goodrich	Continental 4
C. F. Smith	Model 10	Trainer	Smith	Continental 4	C. F. Smith	Model 10	Trainer	Smith	Continental 4
D. E. Smith	Model 10	Trainer	Smith	Continental 4	D. E. Smith	Model 10	Trainer	Smith	Continental 4
E. F. Smith	Model 10	Trainer	Smith	Continental 4	E. F. Smith	Model 10	Trainer	Smith	Continental 4
F. G. Smith	Model 10	Trainer	Smith	Continental 4	F. G. Smith	Model 10	Trainer	Smith	Continental 4
G. H. Smith	Model 10	Trainer	Smith	Continental 4	G. H. Smith	Model 10	Trainer	Smith	Continental 4
H. I. Smith	Model 10	Trainer	Smith	Continental 4	H. I. Smith	Model 10	Trainer	Smith	Continental 4
I. J. Smith	Model 10	Trainer	Smith	Continental 4	I. J. Smith	Model 10	Trainer	Smith	Continental 4
J. K. Smith	Model 10	Trainer	Smith	Continental 4	J. K. Smith	Model 10	Trainer	Smith	Continental 4
K. L. Smith	Model 10	Trainer	Smith	Continental 4	K. L. Smith	Model 10	Trainer	Smith	Continental 4
L. M. Smith	Model 10	Trainer	Smith	Continental 4	L. M. Smith	Model 10	Trainer	Smith	Continental 4
M. N. Smith	Model 10	Trainer	Smith	Continental 4	M. N. Smith	Model 10	Trainer	Smith	Continental 4
N. O. Smith	Model 10	Trainer	Smith	Continental 4	N. O. Smith	Model 10	Trainer	Smith	Continental 4
O. P. Smith	Model 10	Trainer	Smith	Continental 4	O. P. Smith	Model 10	Trainer	Smith	Continental 4
P. Q. Smith	Model 10	Trainer	Smith	Continental 4	P. Q. Smith	Model 10	Trainer	Smith	Continental 4
Q. R. Smith	Model 10	Trainer	Smith	Continental 4	Q. R. Smith	Model 10	Trainer	Smith	Continental 4
R. S. Smith	Model 10	Trainer	Smith	Continental 4	R. S. Smith	Model 10	Trainer	Smith	Continental 4
S. T. Smith	Model 10	Trainer	Smith	Continental 4	S. T. Smith	Model 10	Trainer	Smith	Continental 4
T. U. Smith	Model 10	Trainer	Smith	Continental 4	T. U. Smith	Model 10	Trainer	Smith	Continental 4
V. W. Smith	Model 10	Trainer	Smith	Continental 4	V. W. Smith	Model 10	Trainer	Smith	Continental 4
X. Y. Smith	Model 10	Trainer	Smith	Continental 4	X. Y. Smith	Model 10	Trainer	Smith	Continental 4
Y. Z. Smith	Model 10	Trainer	Smith	Continental 4	Y. Z. Smith	Model 10	Trainer	Smith	Continental 4
Z. A. Smith	Model 10	Trainer	Smith	Continental 4	Z. A. Smith	Model 10	Trainer	Smith	Continental 4

Round for foreign shores, the great new Martin Ocean Transport has been delivered to its purchaser. It is an accomplished fact. It has met its unprecedented performance guarantees. It establishes new world standards. The same design, and greater and more efficient developments from it, are available to American and foreign operators interested in practical long-range equipment for the ocean air routes of the world.

THE GLENN L. **MARTIN** COMPANY
BALTIMORE, MARYLAND, U. S. A.

Builders of Dependable



Always Since 1900

Marketing "Down Under"

(Continued from page 27)

in the sensitive economic conditions may change in the Republic. If a purchaser is sold on the equipment, but the cash to pay for it, and the exchange is unfavorable, he will no doubt wait to make his initial deposit or full payment. However, for example, the C-11 price of the equipment is \$10,000. If the rate of exchange has been fairly steady over some time, say, 18 to \$1 (which means the purchaser needs \$10,000 units for the equipment) and then breaks to 15 to \$1, the purchaser must pay an extra 25,000 units, which breaks the unit price to \$6.66, well below the dollar price steady. Exchange does play a big part in sales, although a few price changes don't often happen. It is a good idea also to lower the general catalog on the sale, wheat, coffee and cotton markets because a good year means ready money and sales.

Due to past regulations in the South American market in receiving payment for merchandise shipped, the present system prevails that cash with the order is the safest procedure. Some manufacturers require a small down payment with the order, with the balance at the factory before the equipment is moved. Others require a check to be sent along with the latest again shipping documents. The only suggestion to smooth over the possible suspicion of accepting order under any conditions is to prepare a letter explaining thoroughly that the manufacturer works on a very small margin and is unable to accommodate any long term payments. Short and superficial replies which are understood as the United States business values themselves as a right is a Latin-American integrity and dignity. Personal experience has shown that this problem is rather steady.

A representative must start with South American buyers in charge of buying. This may vary from \$300 for little aircraft up to as much as \$350 or more for larger equipment, a legitimate sum which protects the manufacturer and gets maximum results for the buyer. Many commercial representatives speaking for manufacturers ignore the question of the cost of buying by putting the buck in the buyer's lap. Explanation should be made in the company of the need for careful costing, but to

a suggestion is save expense it is often possible to get away with open dealing for equipment with complete listing for weight only.

From other personal observations the lack of translated material is a handicap to sales. A catalogue in English is appreciated, but if a manufacturer is posting towards getting more sales in Latin America it is quite necessary to send a small account for customers in Spanish and Portuguese. Two methods are suggested: (1) be post representative through your translation and dealing in the same country, or, let post representative translate your material and return it to the factory to be made up in the states. A still cheaper method is to have the translated material assembled for insertion in your regular English. In any case extensive physical translation should be used, even at the highest printing costs involved. In your catalogues make sure that the availability of any new equipment such as wing patches, door left over from past jobs are at such things are givenly appreciated. Lastly technical assistance on overheads may only be in English. This is a problem for the merchants to write with. Most individual owners are mostly wealthy and their interest is only in the way to fly it. They can be helped with mechanical details. If anything goes wrong the owner always blames the representative and the factory equally.

Thorough instructions for daily operations and daily servicing should be provided in memorandum form, in the language of the purchaser. It is a good idea also to have a stamped metal plate mounted in the cockpit giving detailed starting instructions.

There are few South American aviation publications, and it is doubtful that commercial aircraft manufacturers care to or are able to do an article appropriate for this type of contact. It is also true that representatives do not use these publications merely for the occasional advertising of the representative or his company, or the manufacturer to represent. When the manufacturer releases a new model, representative usually arrange picture and specifications for a single issue. Experience has shown that such advertising

through magazines but the same requests had also contacted the manufacturers, which again brings us back to the problems presented in this article. Personal opinion is that a moderate amount of advertising placed in local publications at a time favorable to sales would be good business. The making of the copy would necessarily be somewhat different than what is used in the United States—something more on the personal, appeal and promotion of the equipment.

The South American market has enormous possibilities. It is highly important, however, to suggest a thorough understanding of the makeup of the Latin-American and its best is to be a long term seller and not a one-time sale. The main pressure by English, German, Italian, Dutch, Czechoslovakian, and French manufacturers to buy their equipment. Therefore the individual pilot American equipment will properly look up the efforts of their own representatives in the field. The latter cannot be expected to assume the entire responsibility. Helpful suggestions, aerial and complete services to begin with, courtesy and careful attention to the customer and business procedures as practices in South America, will give the American manufacturer of potential aircraft a big return for the small amount of effort involved.

Continental A-50

(Continued from page 67)

could accept with any extra type development work at the customer's expense is required.

Specifications

Continental A-50-Direct drive
Type: Air-cooled, horizontally mounted
Number of Cylinders: 4
Bore: 4 1/2 inches (113 mm)
Stroke: 5 1/2 inches (139 mm)
Displacement: 171 cu. in.
Compression Ratio: 14 to 1
Power: 100 horsepower at 2,600 R.P.M.
Power: 100 horsepower at 2,600 R.P.M.
Weight: 150 pounds (68 kg)
Length: 38 1/2 inches (978 mm)
Width: 31 1/2 inches (803 mm)
Height: 33 inches (838 mm)
Mount: Bolt-on
10 inches north-west
11 1/2 inches height

KOLLSMAN EQUIPPED THROUGHOUT NORTHWEST AIRLINES' NEW LOCKHEED 14'S



FLYING FASTER SCHEDULES, WITH TRADITIONAL SAFETY

Northwest Airlines, proud of its Award for safest operation, is maintaining and reinforcing its high standards of flight security with its new Lockheed 14 Sky Zephyrs. Cruising at 230 miles per hour, and with a top speed of 266, these exceedingly fast transport planes fly with Kollsman Precision Instruments guarding every inch, smooth mile between Chicago and the Coast.

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This Offer Good Only in United States, Possessions and Canada.



The tremendous success of the 1936 and 1937 shows has already inspired numerous exhibitors in making early space reservations in the THIRD ANNUAL AIRCRAFT AND BOAT SHOW, April 2-10.

Manufacturers, distributors, operators and enthusiasts from every branch of the aircraft and water craft industry will be represented in this great old-year western exhibit and market place.

For more sales—for greater profits during 1938, plan to be represented in the annual Aircraft and Boat Show. Display your product to thousands of prospective buyers at extremely low cost. Thoroughly planned and carefully located Pan-Pacific Auditorium, 1118,000 square feet, has 40 feet alone to permit the placement of exhibits without discomfort.

Brilliant entertainment as well as show exhibitors for will again assure a tremendous public attendance.

FOR FULL INFORMATION ADDRESS CLIPFOLD TO HENDERSON, MANAGING DIRECTOR, 1930 BEVERLY BLVD., LOS ANGELES



BENDIX *Aircraft* SPARK PLUGS

are setting an entirely new standard of dependability in service with the Airlines

Particularly in engines of high power output, the period between reconditionings has been more than doubled by their use.



A reliable terminus for Bendix-Scintilla sparks

SCINTILLA MAGNETO CO., INC.
(Subsidiary of Bendix Aviation Corporation)
SIDNEY, NEW YORK

Methods of air-mass analysis

now being
adopted by
airways
and
meteorologists



This book presents an introductory treatment of meteorology that emphasizes the theory of air masses and their analysis by synoptic and aerological meteorology. From this book and several airplane pilots and practicing meteorologists will get a basic understanding of this effective tool of weather forecasting and the methods of its use.

Just published

Synoptic and Aero- nautical Meteorology

279 pages, 36 illustrations, \$3.50

By Horace Robert Byers

In Charge, Air Staff, Douglas Field,
U. S. Weather Bureau

THIS book covers all phases of meteorology which form the background for forecasting on the basis of "fronts" and "air masses," with special chapters devoted to phases of weather of particular interest to the aviator, such as fog, cloud and precipitation processes, thunderstorms, severe icing, atmospheric turbulence and their causes. It is the first English text introducing methods of air-mass analysis.

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□ □ □

If we granted every request of our monthly readers, we would be glad to comply with these requests, but unfortunately we have no way of knowing in advance just how many of our unsolicited requests will "materialize."

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CRACK DOWN ON RUST!

Use Liquid to conquer corrosion! This unique patented Rusty preservative provides an airtight, water-tight seal for metal surfaces. Proven to prevent rust, it's a sure way to keep your car for a long time. Get it in extra safety margin for your

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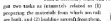
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REVIEWS
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